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Roadless Area Conservation

National Forest System Lands in Idaho

Physical Resources Specialists Report

SOIL, WATER AND AIR

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Abstract

This Physical Resources Specialist Report provides background and information analysis for the affected environment and environmental consequences of the alternatives analyzed in Chapter 3 of the Forest Service Final Roadless Area Conservation - Environmental Impact Statement (FEIS) for Idaho, August 2008. The analysis focuses on five key measures (risk factors) to compare and contrast alternatives: (1) risk to watersheds that have higher potential for soil loss and sedimentation (2) risks to source areas for surface and / or ground water to community public water systems, (3) risks to water quality of 303(d) listed waters, (4) risks to Class I Air Quality areas, and (5) risk posed by existing and proposed miles of road. The report uses these key measures as risk indicators of overall health of the soil, water, and air resources for four management themes considered.

These alternatives would all, to varying degrees, prohibit road construction and reconstruction, timber cutting, sale, or removal, and discretionary mineral activities in Idaho Roadless Areas on National Forest System (NFS) lands in Idaho. The four alternatives considered are:

2001 Roadless Rule (2001 Rule) - Areas designated in Idaho by the Forest Service Roadless Area Conservation Final EIS, November, 2000 refereed as the 2001 Roadless Rule (considered the no action alternative),

Existing Forest Plans (Existing Plans) - Management direction in roadless areas found in Forest Plans for Forests located in Idaho,

Proposed Idaho Roadless Rule (Proposed Rule) - Management direction based on the Petition submitted by then Governor James E. Risch for Roadless Area Management in Idaho, and

Modified Idaho Roadless Rule (Modified Rule) – Management direction based on modifications to the Proposed Rule in response to public comment on the Draft EIS.

The Existing Plans, Proposed Rule, and Modified Rule alternatives place acreages in the General Forest, Rangeland and Grassland (GFRG) land use classification that would allow the most road building and associated other uses. The 2001 Rule has no GFRG category. About 1,263,200 acres in Existing Plans are in management prescriptions equivalent to GFRG. The Proposed Rule would designate approximately 609,600 acres to GFRG. The Modified Rule developed as a result of public comments on the draft EIS reduced the amount of GFRG to 405,900 acres. All alternatives considered would: (1) prohibit most road construction and reconstruction, (2) prohibit timber harvest designed exclusively for commodity production purposes, and (3) allow timber harvest for stewardship purposes. They all would also allow management practices that are intended to reduce the risk of large, severe wildfires that can damage water, soil, and air resources on both NFS lands and adjacent or downstream lands. At present nine leases for geothermal development are pending and one new oil and gas lease has been approved. Because additional specific locations of future geothermal development are unknown, the analysis cannot thoroughly address this potential within Idaho. Projected new permanent road development for all uses is minimal, and average approximately 1 mile per year in the 2001 Rule, 12 miles per year in the Existing Plans, 4 miles per year in the Proposed Rule, and 3.3 miles per year in the Modified Rule. Approximately 0.2, 2.2, 1.7, and 1.4 miles respectively of temporary roads are projected to be constructed. These temporary roads would be decommissioned and inspected before the close of project contracts.

In Idaho, between 2001 and 2006 road construction on all lands administered by the National Forest System averaged 8 miles per year while road decommissioning averaged 230 miles of system and unauthorized roads per year or a 29 to 1 ratio (Annual Roads Accomplishment Reports, 2001 to 2006 [USDA Forest Service 2006]). (see figure 1 and table 3).

Figure 1 - Road Decommissioning, Nez Perce National Forest

Changes between Draft and Final

Added analysis based on the Modified Rule:

Updated spatial data was used when available to provide the most accurate assessment of measures identified to assess risks.

General editorial changes and additional information to improve understanding of topics covered in the document were made.

Based on public comment, proximity to both surface and ground water sources for community water supplies was identified. The draft EIS only identified surface water sources as they were considered the most sensitive to road related contamination. Community water systems are defined as: a public water system regularly serving year-round residents (i.e. a system that serves people at their home; examples include systems that serve towns or subdivisions). This information was used as a proxy of “municipal watersheds”.

Based on public comment in the Backcountry / Restoration (BCR) management theme in Proposed Rule were modified to further clarify and refine where road construction and reconstruction could occur and under what conditions. The measures (risk factors) identified in this report are accessed for all original and new management themes.

Analysis

Methodology

This analysis is done for all National Forests or portions of National Forests in the State of Idaho. None of the Alternatives authorize any specific ground-disturbing action; however, each of the three alternatives would result in varying levels of future road development and other land uses within certain constraints. Due to the broad state-wide scale and the fact that no site specific actions are authorized the comparison of alternatives is general or programmatic rather than project or site-specific.

The Proposed Rule divided Idaho Roadless Areas into five land classification themes: 1) Wild Land Recreation, 2) Primitive, 3) Special Areas of Tribal and Historic Significance (SAHTS), 4) Backcountry / Restoration (Backcountry), and 5) General Forest, Rangeland, and Grassland (GFRG). Existing management direction in the Forest Plans was converted as accurately as possible into one of these categories for comparison. The 2001 Rule most closely reflects the Backcountry theme with some exceptions. The GFRG classification would provide the most possibility of ground disturbing activities. Changes within the GFRG classification between the alternatives when measured against the risk factors give an indication of differences in risk to soil, water, and air resources. In some limited circumstances roads can be built in the Backcountry. Wild Land Recreation, Primitive, and SAHTS categories are generally consistent with the 2001 Rule.

Based on public comment the permissible actions in the Backcountry theme in Proposed Rule were modified to further clarify and refine where road construction and reconstruction could occur and under what conditions. In the Backcountry theme, temporary roads may only be constructed to facilitate fuel reduction in the community protection zones (CPZ)[1] or outside the CPZto reduce significant risk of wildland fire effects to communities and municipal water supply systems, if additional conditions are met. Temporary roads may not be constructed to facilitate general timber cutting for forest health activities; however timber cutting may use existing roads, including those temporary roads constructed for fuel treatment activities. Roads must minimize surface disturbance, be used only for their intended use, and be decommissioned after use.

A literature review on the effects of various land management activities on erosion and sedimentation, water quality, and air resources pertinent to Idaho's climate, landforms, and vegetation cover was conducted. A synthesis of the information used was completed to assist in understanding differences among the alternatives.

Several measures were selected to aid in theanalysis comparison of alternatives. These measures can be evaluated by theme and include: 1) number of acres located in watersheds used for source water community supplies[2] for both surface and ground, 2) number of acres located in watersheds with water bodies not meeting water quality standards identified on Idaho's 303(d) list of impaired waters, 3) number of acres of sensitive soils with high hillslope and / or landslide risks, 4) number of acres within 50 miles of Class I air quality areas, and 5) the number of

[1] About 442,000 acres are within 1 ½ mile of a community are within a community protection zone in BCR.

[2] A public water system that regularly serves year-round residents (i.e., a system that serves people at their homes; examples include systems that serve towns or subdivisions).

existing and anticipate road miles. Differences among these parameters served as **indicators of relative risk t**o the soil, water, and air resources for the various alternatives are presented.

Assumptions

Scale and Magnitude of Changes Among Alternatives - Differences in the amount of the GFRG theme among alternatives are not great: 1,263,200 in the Forest Plans and 609,600 acres in the Proposed Rule. The Modified Rule reduced this amount to 405,900 acres. These changes represent approximately 0.024 percent, 0.011 percent, and .008 percent of Idaho's total 53,487,360 acre land area, respectively. About 40 percent of the changes in the Modified Rule are on the Caribou-Targhee National Forests. With the possible exception of the Caribou-Targhee National Forests, few of the differences in the indicators selected were expected to be significant at the watershed scale (40,000 to 250,000 acres). None of the changes are expected to be significant at the state wide scale for the risk factors used in this analysis. However, the differences may be important at site specific locations. Site specific evaluations would be done during project planning to address specific issues and risks.

Population – Idaho will continue to see rapid growth at the present or greater rates. Between July 1, 2004 and July 1, 2005 the population grew by 2.4 percent or 33,956 people, making it the third fastest growing state in the nation. The current population is approximately 1, 429,000 (Idaho Department of Commerce 2005).

Budget Trends Anticipated – USDA Forest Service budgets may remain flat in nominal terms but decline in real terms. This implies: 1) reducing the miles of roads being maintained by putting roads into self maintaining, long term storage, decommissioning, or obliterating them, 2) little new construction, and 3) lowering maintenance standards on roads remaining. These changes would occur at the very time when demands for motorized access are increasing due to rapid population growth and the fact that the post WW II "baby boomers" generation is now an aging population, many of whom may desire more vehicle access on higher standard roads.

The 2008 Appropriations Bill directed the Forest Service to move funds into a new program "Legacy Roads and Trails". If this program were to continue the number of road miles maintained, put into long term storage, or decommissioned could increase over present levels.

Fire Frequency – A warming climate has caused (in concert with other factors) the increase in fire frequency and the number of acres burned since the middle 1980s. The greatest increases in fire have occurred in mid-elevation, Northern Rockies forests and are strongly associated with earlier snow melt runoff. Since the middle 1980s, approximately 72 percent of the total acres burned have been in early snow melt years. It is anticipated that the warmer conditions with earlier snow melt seen in Idaho over the last decade would continue and that the risk of fire and the expense of fire suppression would increase commensurate with the warming climate (Westerling et al. 2006). Continued efforts to reduce fuel hazards by thinning vegetative fuel cover, conducting controlled burns, and wider use of fire use fires (prescribed natural fire) would be ongoing. Priority for fuels treatment and fire suppression will continue to be given to wildland urban interface areas and municipal watersheds (Mote et al. 2005).

Burned Area Emergency Response, Rehabilitation, Restoration, and Limitations – Following wildfires, emergency stabilization is conducted through the Burned Area Emergency Response (BAER) program. The program is designed to quickly identify and reduce post fire risks to life, property, and significant ecosystem values as a result of the fire. Wildfires often increase the

risk of factors such as: damaging erosion, debris torrents, sedimentation, flooding, and infrastructure damage such as burned guard rails along a forest roads and tree blow-down due to burned roots and later due to decomposing roots. Roads are commonly treated through the BAER program to reduce the risk of adverse impacts of post fire flooding and debris torrents. Treatments may include increasing the size of drainage structures, building overflow spillway structures, increasing the number of cross drains, construction of trash racks, or culvert removal. Other actions commonly applied include mulching, seeding, treating weeds, establishing warning signs, and closing roads and trails. All actions under BAER authority must be completed within one year of fire containment. Longer term rehabilitation and restoration needs such as reforestation and burned facility replacement are addressed through normal program funds (FSM 2523). These programs are anticipated to continue.

Following fires with severe effects, sediment yields may increase and recovery may take from 5 to 15 years (DeBano et al. 1998.). In the most severe cases, even with large expenditures of emergency stabilization-BAER funding, significant increases in sediment yield over background levels have been observed. One study documented sediment yield following the Cerro Grande Fire-Los Alamos, New Mexico that burned in high mixed conifer dominated by ponderosa pine, Douglas fir, and white fir. The area was typical of southwestern forests where fire had not been allowed to play a natural role. As a result meadows and openings between trees resulting in higher than natural number of stems per unit area. The fire burned approximately 32 percent of a 6.41 sq. mile watershed at moderate or severe levels, 32 percent experienced low severity, and the rest was unburned. This fire burned approximately 250 homes and threatened the Los Alamos National Laboratory. The following table illustrates the amount of sediment yielded from the watershed as a result of the fire. The first year following the fire yielded 500 times more sediment than the previous 52 years (Lavine et al. 2006). It should be noted that the BAER program prescribed and conducted extensive seeding, straw mulching, road drainage improvement, and straw wattle installation to encourage recovery and reduce surface erosion risks (see figure 2).

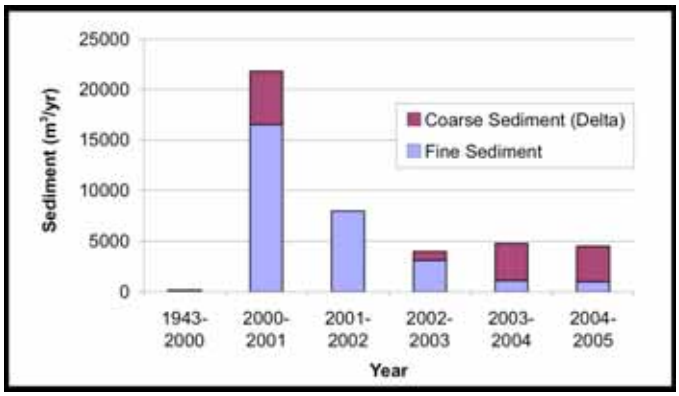

Figure 2 - Sediment Yield, Los Alamos Canyon Following the Cerro Grande Fire

The Myrtle Creek Watershed serves as the Bonners Ferry, Idaho municipal watershed providing water to approximately 3,500 residents. Several episodes of fire related turbidity (cloudy or muddy appearance) yield occurred following the 3,600 acre 2003 Myrtle Creek Fire. On July 4, 2004 approximately 1.5” of high intensity rain fell on the burned area. Turbidity readings far exceed drinking water standards of 5 NTUs above natural background if the natural background is under 50 NTUs. Note that levels dropped soon after the storm (Power Point

Presentation by Jennifer Hickenbottom, District Hydrologist, Bonners Ferry RD, 2007, IDAPA 58.01.02, 252.01.b.ii.(1))(see figure 3).

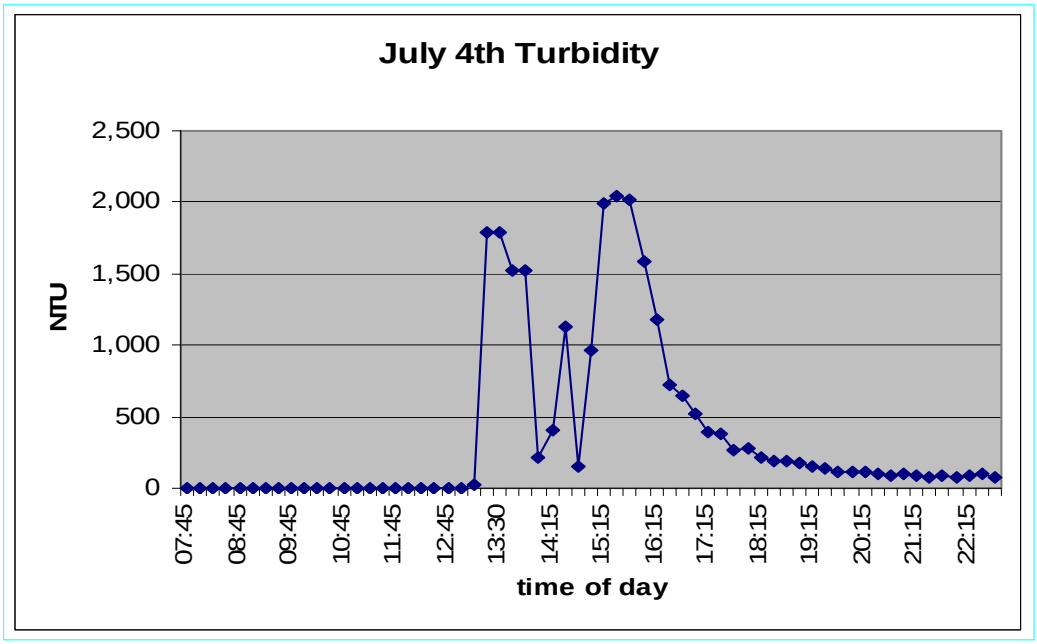

Figure 3. Myrtle Creek Turbidity Readings, almost 1 year after the burn.

The following pictures illustrate both the post fire response and the effectiveness of post fire mulching, ground based hydro-seeding, aerial mulching, aerial and hydro-seeding. A second storm in March 2007 saturated soils within the burned area that resulted in four debris torrents. Figures 4 and 5 demonstrate that BAER treatments can be effective against short duration thunderstorms but cannot guarantee post fire protection to water quality under saturated soil conditions.

Figure 4. A draw within the burned Myrtle Creek Watershed withstood substantial flows with little downcutting July 2004

Figure 5. March 2007 Debris Torrent within the burned area of the 2003 Myrtle Creek Fire

Though these post fire runoff responses can adversely affect the water quality for watersheds providing municipal water supplies, periodic events similar to these may be unavoidable natural phenomena. Several researchers have noted that the asynchronous nature of fire and other natural disturbances may result in a mosaic of stream habitats that support biological diversity. (Rieman et al. as reported in Roper et al. 2007).

Fuels Treatment - As a result of increased fire activity since the middle 1980s, increased efforts to reduce fuels are being conducted across the Western United States in an effort to reduce risk. Although fire suppression is thought to have increased the risk of larger more intense wildfire, especially in the drier forest types by reducing the natural role of fire in thinning forests, climate is thought to be the dominant factor as periods of large intense fires have happened long before effective fire suppression. Upper elevation subalpine forests are not felt to have changed as significantly in response to fire suppression as they were dense historically with relatively long periods between stand replacing fires (Schoennagel et al. 2004). Dry ponderosa pine forests fire regime have become more dense and may benefit most form thinning and prescribed burning may move forests toward more natural conditions (Schoennagel et al. 2004). Across the Rocky Mountain region, mid-elevation forests may present the most problem for land managers as they have mixed fire regimes (Schoennagel et al. 2004). Fire use fires (prescribed natural fires) where fire are allowed to burn to achieve desired ecosystem adjustment and use of controlled burns will likely become increasingly important tools for fuels treatment.

Water Supply - Growing populations in urban and rural areas will increase demand for reliable quantities of high quality water for domestic, agricultural, recreation, and industrial purposes. Communities dependent on surface water supplies may be most vulnerable to changes as a result of land management actions associated with Forest road networks. Activities associated with road development on NFS lands such as mineral extraction may adversely affect both surface and ground water sources. Public water sources are termed source waters. In Idaho >95 percent of all source waters are from ground water. The physical area around a well or surface water intake is used as the focal point of a source water assessment. The State of Idaho, Department of Environmental Quality (DEQ) conducts source water assessments that delineate land areas to be protected, identify potential contaminant sources and the susceptibility of these sources to contamination. Source water protection involves voluntary drinking water protection

activities implemented at the local or community level. Public water systems are divided into three main groups:

Community: A public water system that regularly serves year-round residents (i.e., a system that serves people at their homes; examples include systems that serve towns or subdivisions).

Non-community, non-transient: A public water system that serves at least 25 of the same people, four or more hours per day, for four or more days per week, for 26 or more weeks (i.e., a system that serves always serves the same people, but not at their homes; examples include systems that serve schools or businesses).

Non-community, transient: A public water system that does not serve at least 25 of the same people, four or more hours per day, for four or more days per week, for 26 or more weeks (i.e., a system that serves different people all the time; examples include systems that serve campgrounds or rest areas)[3].

The number of communities and the number of total users of water flowing from watersheds containing NFS lands are likely to increase as the populations grow.

Watershed Size - Land management activities can adversely affect water, soil, and air resources. The probability of measuring and detecting the effects of many activities on watershed resources, such as temperature or water yield changes, generally increases as the size of the watershed decreases. The effect of a specific activity may be undetectable within a larger watershed while that same activity may be detectable in a smaller watershed. This difference is mainly due to the percent of total treated area within a given watershed, though other factors such as the reduced likelihood of high intensity rainfall or a deep snow pack covering an entire large watershed, and the added length of time it takes for water to reach the mouth of a larger watershed from where it has fallen are also factors (Black 1996).

Water Quality - The Environmental Protection Agency (EPA) has delegated the primary responsibility to implement actions that comply with the Clean Water Act to the State and Tribes to assure management practices comply with their requirements. State-integrated 303(d)/305(b) reports are generally submitted to and approved by the EPA every two years. These reports enumerate the number of water bodies not meeting their beneficial uses and State water quality standards. About 8,600 miles of streams in Idaho are identified as not meeting State water quality standards, of which about 445 miles (5 percent) are in Idaho Roadless Areas. As total daily maximum load (TMDL) reports or watershed analyses are completed, restoration needs would be identified, prioritized, and corrective actions would be taken on National Forests in Idaho as funding becomes available. Budgets used for watershed restoration may remain flat in nominal terms but decline in real terms into the foreseeable future.

Roads, timber cutting, mining, energy development, and other land-disturbing activities may indirectly affect water quality by baring soil surfaces to erosion or increasing the release of certain nutrients from the decomposition of timber cutting byproducts (leaves, branches, and other organic matter). Nutrients such as nitrogen, phosphorous, potassium, and calcium may increase in stream water following timber management activities (USDA Forest Service 1991). Elevated nutrient levels in streamflow usually return to normal in one to four years (USDA Forest Service 2000a).

[3] www.deq.state.id.us/water/data_reports/source_water/drinking_water_protection_guidance.pdf

Timber Harvest Activities – Future timber harvest activities would be conducted primarily for fuels treatment. Estimated annual harvest volume differences from the estimated 600 acres in 2001 Rule are about 13.4 million board feet on 2,700 acres in the Existing Plans and 5.8 million board feet on 1,200 acres in Proposed Rule. The new Modified Rule would harvest about 5.0 million board feet per year on 1,000 acres (log trucks can haul approximately 5,000 board feet). Over 15 years it is estimated that the 2001 Rule would harvest 9,000 acres, Existing Plans would harvest 40,500 acres, the Proposed Rule would harvest 18,000 acres, and the Modified Rule would harvest 15,000 acres.

Forest Road Density – Higher road densities (the number of linear miles of roads per square mile) are assumed to increase risk of road related erosion and sedimentation.

Proximity to Water - The potential risk of activities affecting watershed resources generally increases with proximity to the water body itself. Roads or harvest units adjacent to or near water bodies generally have a higher likelihood of impacting the water than a similar activity further away from the water. One exception, the impacts from landslides or debris torrents may be miles down slope from the initiation point and the volume of debris carried in some cases may increase in a downslope direction.

Best Management Practices (BMPs) and Contract Requirements – BMPs are defined in The State of Idaho Water Quality Standards and Wastewater Treatment Requirements (Idaho Administrative Procedures Act 16.01.2003,01) as "a practice or combination of practices determined by the Department [of Health and Welfare] to be the most effective and practicable means of preventing or reducing the amount of pollution generated by nonpoint sources". The Idaho Division of Environmental Quality is delegated authority to implement Section 208 of the Federal Clean Water Act to evaluate whether the BMPs adequately protect beneficial uses. In 1980 the Idaho Water Quality Standards were amended to identify the Forest Practices Act rules and regulations as the silvicultural BMPs for Idaho (Idaho Department of Health and Welfare 1985, 1989 as reported in Seyedbagheri, 1996). BMPs represent the state of current knowledge on practical methods to prevent or reduce pollution from non-point sources. Using cost effective, up-to-date BMPs for the design, operation, and maintenance of forest roads, timber harvest, and other ground disturbing activities would prevent or mitigate most adverse impacts to watershed resources. It is assumed that each project will implement BMPs.

Monitoring and Adaptive Management – Projects on National Forests are required to incorporate BMPs and monitor their implementation. In addition, formal reviews are conducted at the Forest or Regional levels as well as by the State of Idaho (2004 Idaho Interagency Forest Practices Water Quality Audit 2007) on a subset of timber harvest areas, road construction, and other management activities. Recently, Forests have been directed to develop and conduct Environmental Management System (EMS) audits. Information gathered at these various levels of review are used to adjust management as needed improvements are identified. This approach is anticipated to continue at the project, Forest, and Regional levels.

Proximity to Class I Air Quality Protection Areas - Class I Air Quality Protection Areas are geographic areas designated for the most stringent degree of protection from future air quality degradation. The Clean Air Act designates as mandatory Class I areas each National Park over 6,000 acres and each Wilderness or National Wildlife Refuge over 5,000 acres in existence as of August 7, 1977. The potential risk of an activity affecting Class I Air Quality Protection Areas generally increases with proximity to the area, all factors remaining equal.

Modification of Management Prescriptions - Should future public interest be best served by altering the management prescriptions for a given areas, each Alternative would require different procedures and timeframes. All would require public involvement and review.

General Background Information Used:

- Forest Service Roadless Area Conservation Final Environmental Impact Statement, Nov., 2000
- The Petition of Governor James E. Risch for Roadless Area Management in Idaho, Oct. 5, 2006
- Federal Register, January 12, 2001, Part VI, Department of Agriculture Forest Service 36 CFR Part 294, Special Areas; Roadless Area Conservation; Final Rule
- Idaho National Forest Land Management Plans
- Final EIS Interior Columbia Basin Ecosystem Management Project web site spatial data http://www.icbemp.gov/
- Inland West Watershed Initiative
- Forest Service Roadless Area Conservation Final Environmental Impact Statement Physical Resources Specialist Report, November 2000 by Russell LaFayette
- Mapped 303(d) stream reaches and lakes as identified by Idaho DEQ
- Mapped surface and ground water Community waters supplies, Idaho DEQ
- Mapped 6th Code HUCs Watersheds (watersheds between 10,000 and 40,000 acres in size)
- Idaho Forest Information Displayed on Forest web sites
- Numerous peer reviewed papers or other sources as cited

Affected Environment

Geography and Population - With 80 recognized mountain ranges Idaho is home to some of the most spectacular scenery and most rugged landscapes in the United States. Idaho is the 14th largest state covering 83,564 square miles (53,480,960 acres) in size. Largely because of the rugged topography found on Idaho's National Forests, the State has more area designated "Roadless Area" in all three alternatives being assessed than any other state except Alaska, the nation's largest state.

Sixty-four percent of the land base in Idaho is publicly owned. The largest percentage (38 percent) of the land base in Idaho occurs on NFS lands. There are 20,464,400 acres of NFS lands in Idaho. All twelve National Forests in Idaho have Roadless Areas. About forty-six percent or 9,904,300 acres of the NFS lands in Idaho are classified as Roadless Areas.

Hillslope and Stream System Adjustment – Erosion and deposition of eroded material is a natural process. Erosion rates are not uniform; lithology, geologic structure, tectonic uplift, and climate (includes large magnitude episodic precipitation events, droughts, wildfire, gradual or rapid climate change…) can all alter erosion rates. Human actions can further affect changes in erosion and deposition rates (Bull 1991). Removal of vegetation or road construction may in combination with ongoing natural processes accelerate erosion and set up a number of related

geomorphic responses on hillslopes. A recent study in western Montana illustrates that fire and related floods can play an important role influencing the processes of erosion and stream system adjustment (Parrett et al. 2001). Periods of erosion followed by relative periods of stability can be expected as a result of geo-climatic-anthropomorphic complexity. These complex hillslope possesses directly affect channel response and adjustment.

Relative sensitivity to erosion was mapped. Data used to identify sensitive areas are derived from the Final Environmental Impact Statement (FEIS), Interior Columbia Basin Ecosystem Project and Inland West Watershed Analysis (Interior Columbia Basin Ecosystem Management Project maps, http://www.icbemp.gov/). Watersheds from 10,000 to 40,000 acres (6th Code watersheds) were assigned a level of low, moderate and high soil sensitivity. This database represents an estimate of soil types based upon varying intensity levels of soil inventory. Watersheds were assigned a sensitivity class based on the percentage of various soil types located within the watershed. The map is not accurate for site specific use but was constructed to be used qualitatively to compare alternatives.

Anthropomorphic Factors Affecting Hillslope and Stream Systems

Mining –To comply with the Clean Water Act these activities must adhere to the National Pollutant Discharge Elimination System (NPDES) permit program controls that regulate point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or man-made ditches. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. In Idaho the United States Environmental Protection Agency is responsible for issuing NPDES permits.

Phosphate and other non-renewable mineral resources are anticipated to become increasingly valuable as world sources are depleted and populations continue to grow. Extraction of mineral resources using current BMP can be accomplished with acceptable impacts to water quality (Best Management Practices for mining in Idaho [Idaho Department of Lands 1992]).

About 7,230 acres of phosphate deposits are under existing leases can be found in seven roadless areas (Dry Ridge, Huckleberry Basin, Meade Peak, Sage Creek, Schmid Peak, Stump Creek, and Mount Jefferson) and are under existing lease. Approximately 30 acres of these areas have been mined to date. There are nearly 14,460 acres of known phosphate deposits that are unleased. About 1,100 acres associated with the Smoky Canyon Mine expansion could reasonably be expected to be developed within the next 15 years and could affect Sage Creek and Meade Peak Roadless Areas. It is also reasonable to assume that the remaining phosphate deposits currently under lease (roughly 6,100 acres within the seven roadless areas) would be permitted and developed sometime in the extended future. Using the existing Smoky Canyon phosphate mine expansion as an example of the level of activity, it is estimated that about 17 miles of haul road construction and associated disturbance would eventually take place in the seven roadless areas.

Selenium contamination with phosphate mining has become an issue in recent years (VanKirk and Hill, 2006). Mining exposes organic carbon-rich waste rock to subaerial weathering. Waste rock is generated at a rate of 2.5 to 5 times that of mined ore. Individual dumps in Southeastern Idaho contain millions of tons of waste-rock that is either contoured into hills, used as cross-valley fill, or used as back-fill in mine pits. Waste shale in comparison to ore, is more enriched in selenium (80 ppm Se v. 50 ppm Se) see:
(http://wwwrcamnl.wr.usgs.gov/Selenium/Mining.htm.).

Selenium can bio-accumulate and can be toxic to both terrestrial and aquatic plants and animals. Water quality standards related to selenium are currently under development by the EPA using selenium concentrations in fish tissue as one of the criterion. The EPA drinking water standard for selenium is 0.05 ppm. Water quality standards related to selenium are currently under development by the EPA using selenium concentrations in fish tissue as one of the criterion. The toxicity of selenium depends on whether it is in the biologically active oxidized form, which occurs in alkaline soils (Environmental Protection Agency 2008).

Selenium specific BMPs have been developed for the Smoky Canyon Mine on the Caribou portion of the Caribou / Targhee National Forest (USDA Forest Service and USDI Bureau of Land Management 2007). The level of effectiveness of the measures adopted has been questioned (Myers 2007). This programmatic EIS in no way reduces the responsibility of the USDA Forest Service to the National Forest Management Act, National Environmental Policy Act, Clean Water Act and other Acts, Executive Orders, and policies.

Approximately 132 acres of existing phosphate leasing areas are in watersheds with community water supplies. An additional 636 acres are in areas that are unleased or have leases pending. These areas are on the Caribou-Targhee National Forest and include Dry Ridge, Huckleberry Basin, and Meade Peak watersheds.

Many legacy mine sites within NFS boundaries have been identified for treatment as funding becomes available. Some are being addressed through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the federal law for investigating and correcting contamination.

Geothermal Development - Utilization of geothermal resources would require development of appropriate BMPs to ensure protection of water quality. New road access, pipelines, power lines, wells, and other structures would be required. If carefully planned and implemented, the overall environmental tradeoffs could be heavily weighted in favor of the ability to produce atmospheric carbon emission free power.

Grazing – Most impacts from grazing are considered non-point and are regulated through the use of Best Management Practices (though holding pens used more than incidentally or other similar facilities may classify as point sources). Preserving ground cover is generally the most effective means of preventing non-point sources of accelerated erosion. Alternatives with fewer ground-disturbing activities generally pose lower risk to water, soil, and air resources. No increases in livestock grazing or decreases in protective range management practices are anticipated.

Timber Harvest Activities – Future timber harvest would be conducted primarily for fuels treatment. The harvest unit includes two general types of activities that may affect water, soil, and air resources: (1) the cutting and skidding or other transport of the trees within the logging unit, and (2) post logging residue fuels treatment. In 1974 the State of Idaho established a comprehensive Forest Practices Act (Idaho Code 38-13). The purpose is to encourage timber harvest and related activities that maintain or enhance trees, soil, air, water, wildlife and aquatic habitat. BMPs have been promulgated as Rules Pertaining to the Idaho Forest Practices Act (IDAPA 20.02.1). Since their adoption BMPs have been an effective tool for helping forest managers minimizes impacts from forest practices (Idaho Department of Lands 2000). In addition, Forest Service Contract Provisions specifically regulate how logs are moved from

where the tree was felled within the harvest unit to landings where they can be loaded on trucks and have improved over time.

Jammer logging with its high road densities is no longer practiced on NFS lands. Traditional skid trails may still be used, but today they are required to be carefully located to minimize the density needed and are only used under specified soil moisture conditions. Other practices currently used include logging over frozen ground and snow, more frequent use of felling/bunching equipment, and use of forwarders to reduce the number of equipment passes over soil surfaces. Skyline and/or helicopter yarding is now standard on steep terrain. These practices are designed to reduce soil disturbance. Fuels treatments can vary by site and may include: hand or machine piling and burning, broadcast burning, whole tree yarding and either selling the slash as a product or burning large piles at the landing. Of these, machine piling and burning is of most concern as it must be carefully conducted to minimize impacts such as bare soil, soil compaction (which can cause reduced infiltration rates, greater surface runoff, and loss of productivity), and associated potential surface erosion (2400-6 and 2400-6T Standard and Special Contract Provisions, R1/4 Soil and Water Conservation Practices, IDAPA 20.02.1).

Stewardship Treatments – All Alternatives allow timber harvest for stewardship reasons. Stewardship projects enable managers to implement actions to treat insect and disease outbreaks and reduce the risk of large, damaging wildfire and associated smoke, and other watershed restoration needs identified.

Roads and Timber Harvest Effect on Runoff Timing – Timing of water runoff (how quickly a watershed generates runoff and the time it takes for that water to travel downstream) can change as roads and related drainage structures intercept, collect, and divert water. This accelerates water delivery to the stream, by intercepting, concentrating, and diverting runoff resulting in more water becoming storm runoff, which increases the potential for runoff peaks to occur earlier, be of greater magnitude, and recede more quickly than in unroaded watersheds (Wemple et al. in USDA Forest Service 2000b).

Relationship between Roads and Timber Harvest to Water Yield - Timber harvests can cause an increase in total annual water yield. Changes in total annual water yield would most likely be detected where there is abundant moisture to begin with, and where the soil has less ability to absorb additional water (Harr 1983; Kattelmann et al. 1983; Ziemer 1987). Changes in total annual water yield are generally less detectable in the drier areas where additional water is quickly used by the remaining plants or is lost through evaporation (Schmidt and Solomon 1983 as reported in USDA Forest Service 2000a). The time it takes for water-yield to return to pre-harvest levels (within natural variation) is more or less proportional to how quickly the site revegetates. Regrowth of vegetation in humid areas is usually more rapid and flows generally return to normal levels 6 to 10 years after harvest. Slower growth in drier areas may require longer time frames to recover (Stone and others 1979 as reported in USDA Forest Service 2000a).

Small watershed studies in the Rocky Mountains indicate that a 15 percent or greater harvest can increase measurable annual water yield (Stednick 1996). The small Horse Creek watersheds (54 to 213 acres) on the Nez Perce National Forest yielded from 15 to 36 percent more instantaneous flow than before road construction and clear cut timber harvest removed from 20.9 to 32.6 percent of the watershed timber (King 1989). Under foreseeable management scenarios, it is unlikely that any HUC 6th Code watersheds (10,000 to 40,000 acres) would be harvested at levels approaching 15 percent in any of the Alternatives within a 25 to 30 year

tree / vegetation recovery period. Increased water yield is not anticipated at the 6th Code watershed scale as a result of any of the alternatives.

Relationship of Roads and Timber Harvest to Flooding - Large magnitude flood events are generally the result of extended periods of precipitation and / or rapid snow melt runoff that exceeds the capacity of the soil to hold additional water (Lull and Reinhart 1972; Swanston1991). Though land use practices may reduce soil water holding ability, flooding can occur regardless of the land use practices. The increased risk of peak flows from small research watersheds following logging has been documented. The ability to detect relative effects of timber harvesting and roads on flooding decreases as watershed size increases. The extra flow generated in smaller watersheds becomes less evident as it joins flows from other watersheds and continues downstream (Thomas and Megahan 1998; Ziemer 1998). Additional water from smaller watersheds enters the main stream at different times. This action desynchronizes the flows, moderating net flow increases. In addition, the larger the watershed the less likely it is to receive heavy rainfall or deep snow packs across the entire watershed. A study examining episodic storms in Northern Idaho on low volume roads stated that Forest Service roads were a major contributor to sediment, but were less than natural landslides that occurred in the 1995 and 1996 flood events (Foltz et al. 2008). According to this study, the total result of landslides appears to be within the transport capacity of the aquatic system.

Plants roots provide reduced risk from landslides as roots assist in binding soils. Also live trees and roots uptake and absorb water, to reduce the risk of flooding. Numerous studies have shown that areas recently harvested may increase risk of landslides and associated flooding due to the removal live vegetation and decaying roots. Following harvest of coniferous forest and associated road building, root strength may decrease in the short term (4-15 years) then increase again with growth of new vegetation (Satterlund and Adams 1992).

Many legacy roads built in the 1950s to 1970s did not use design or construction methods commonly used today. As a result unstable areas and wetlands were not routinely avoided nor were culverts designed to properly handle appropriate flood flows or pass aquatic species. Consequently, forest roads are considered by many the single most important factor affecting watersheds. When natural events such as wildfire or floods occur in areas with legacy roads, the likelihood of catastrophic failures, which may be already high, greatly increases (Parrett 2001). These areas would have increased risk to water quality. Today's design and construction practices reduce but do not eliminate road associated risks.

This programmatic EIS cannot address site specific road location issues. However, projects would need to identify and addressed specific resource concerns in site-specific analysis during project planning processes. The USDA publication, "Forest Service Roads: A Synthesis of Scientific Information," (USDA Forest Service 2000a) summarizes most of the effects of roads and timber harvests on hydrologic regimes.

Roads and their Effects on Water Quality – Roads, and associated activities such as timber harvest, mining, energy development, motorized recreation, and other land disturbing activities may affect water quality by baring soil surfaces to erosion or increasing the release of certain nutrients from the decomposition of timber harvest byproducts (leaves, branches, and other organic matter). Potentially roads may induce more erosion and sediment than all other forest management activities. Observations in the northern region of the USDA Forest Service indicate that as much as 90 percent of the sediment produced from timber sales is associated with roads (Packer and Christensen, 1964 as reported in Satterlund and Adams 1992, page 325). Nutrients,

such as nitrogen, phosphorous, potassium, and calcium, may increase in stream water following timber management activities (USDA Forest Service 1991). Elevated nutrient levels in streamflow usually return to normal in 1 to 4 years (USDA Forest Service 2000).

Heavy industrial traffic can wear away surface gravel and pulverize into sand, silt, and clay sized particles. These smaller particles are more easily washed into stream channels or may add to atmospheric dust. The risk is assumed to be higher with greater miles of road construction and reconstruction. The risks of inadvertent contamination to water bodies from petro-chemicals would also increase as use increases. Dust abatement using dust palatives, such as magnesium chloride would more likely occur on high traffic permanent roads, such as those used for phosphate mining or commercial timber hauling.

Roads and their Effect on Water Temperature – Road construction and reconstruction and timber harvest may cause water temperature to change where groundwater is intercepted and brought to the surface, where the stream channel shape becomes wider or shallower due to road related sedimentation, or where loss of tree cover in riparian areas reduces shading (USDA Forest Service 1991). Temperatures may rise sharply in exposed areas and some of those elevated temperatures may then return to normal levels as water re-enters shaded areas downstream or receives cool inflow from other streams or groundwater (Pierce and others 1992 as reported in USDA Forest Service 2000a). Smaller or shallower streams are generally more susceptible to temperature fluctuations than larger or deeper streams (USDA Forest Service 2000).

Open Roads – A detailed report presenting a synthesis of scientific information related to forest roads can be seen in USDA Forest Service Gcinski et al., 2000. The potential impact of roads on erosion and sedimentation often exceed all other activities associated with timber harvest (Satterlund and Adams 1992, page 325). Hydrologic changes as a result of harvest and road construction generally decreases over time following construction although roads may be a continual source of chronic erosion and sedimentation (Thomas and Megahan 1998, MacDonald and Coe 2006). Road surfaces are compacted and have low infiltration capacities; this means that precipitation will become surface runoff that can concentrate and be discharged in areas where concentrated flow was not present before the road was constructed. Drainage patterns and roads are both networks, but they generally run perpendicular to each other; i.e. roads usually cut across slopes while streams flow down slopes. Effects can occur where roads intersect drainages. Increases in the percent of fine sediment measured below road stream intersections have been measured in granitic soils in Colorado (Schnackenberg and MacDonald 1998). Designing road stream intersections to accommodate disturbances (large floods, debris flows etc.) is important to reduce road failures (Furniss and others 1997 as reported in USDA Forest Service 2000b). A dense road network interacting with a dense stream network will have a higher likelihood of effects than a limited road network overlaying a sparse drainage pattern. Roads that parallel drainages in close proximity to streams are at particular risk of adversely impacting stream systems. Forest roads located adjacent to water bodies are often a direct source of sediments, other pollutants, and increased flow volume. In steep landslide prone terrain the risk of mass movement (landslide and debris torrents) can be greatly increased by roads (USDA Forest Service 2000b).

Temporary road or trail – A road or trail necessary for emergency operations or authorized by contract, permit, lease, or other written authorization that is not a forest road or trail and that is not included in a forest transportation atlas (36 CFR 212.1 (9)). To address long term road

caused erosion and sedimentation and to reduce road maintenance costs current policy is to decommission temporary roads following contract completion (FSM 7705).

Both temporary and permanent roads would have increased risks of erosion and sedimentation during the construction phase and for the first few years after construction. Temporary roads built with fewer design specifications may present a higher short term risk than designed roads with detailed construction specifications. Research in Idaho has shown that appropriate stabilization techniques can greatly reduce road related erosion (Buroughs and King 1989).

Road Decommissioning – Results in the stabilization and restoration of unneeded roads to a more natural state (36 CFR 212.1 (9)). Road decommissioning can be conducted to remove unauthorized travel ways, temporary roads, or system roads that are no longer needed. Short term increased risk of erosion and water quality may occur during the decommissioning activity. The length of time needed for recovery would vary according to factors such as treatments used when road was closed, climate, soil type, and terrain. A recent study has documented the affect of culvert removal using standard BMPs on turbidity documented the level of sediment and turbidity yielded and the effectiveness of straw bale placement as a BMP (Foltz et al. 2008). Roads decommissioned should return to near background levels of erosion and sedimentation risk as vegetation reestablishes and effective ground cover increases.

Road Storage/Maintenance level 1 - Roads needed for current management but are anticipated to be needed in the future may be closed and left in a self maintaining condition. Culverts are generally removed, additional cross drains (water bars) are constructed, and other measures such as spreading protective slash to reduce surface erosion (also discourages wheeled travel) are implemented on the road bed as needed (FSH 7730).

Water Used for Community Water Systems – Both surface and groundwater can be adversely affected by improper land use. Both surface and groundwater community source supplies (domestic supplies) were selected as a risk factor in this analysis as ground disturbing activities could directly affect their suitability for use in a public water supply. Idaho DEQ data bases were used to determine the location of watersheds that provide surface water as a public supply.

Air Quality – Congress established a national goal to prevent visibility impairment and improve visibility in all Class I areas. Class I air quality areas are National Forest System Wilderness areas, National Parks, or National Wildlife Refuges greater than 5,000 acres in size, designated prior to the establishment of the Clean Air Act Amendments of 1977. Class I areas can also include lands designated by tribes or States. These areas serve as benchmarks for monitoring changes in air quality over adjacent lands. There are 12 Class I areas within 50 miles of any point in Idaho. The goal is to reduce regional haze that now affects Class I areas to near natural background levels. Atmospheric emissions from road construction, unsurfaced or gravel road dust, volatile organic compounds from gasoline or soot from diesel engines, open pit mining operations, and smoke from fire use fires, prescribed burns, slash treatment, or wildfires all may contribute to haze levels. Idaho DEQ is consulted and authorizes management authorized burning to reduce adverse effects by choosing timeframes that would allow for maximum dispersion of smoke (USDA Forest Service 2007).

Environmental Consequences

2001 Roadless Rule

This alternative applies the strategy introduced by the 2001 Rule, the purpose of which was to ensure that inventoried roadless areas sustained their values for the current and future generations. Under the 2001 Rule, particular conditions applied with respect to permissibility of selected management activities within Idaho Roadless Areas (IRAs) (See Chapter 2 of FEIS for detailed description of this alternative):

Road construction and reconstruction – prohibited except as provided in seven exceptions that revolve around public health and safety (e.g., catastrophic events, CERCLA, etc.) prevention of irreparable resource damage, and existing rights or jurisdictions.

Timber cutting – limited to four (4) exceptions: for the purposes of conservation of threatened, endangered and proposed species (TEPS) and ecosystem maintenance and restoration, where incidental to other activities that are not prohibited (including personal and administrative uses), and where roadless characteristics already have been compromised due to roads or timber harvest.

Discretionary mining – minerals exploration and exploitation not directly prohibited, but the construction or reconstruction of roads associated with leases issued after January 12, 2001 was prohibited except where associated with reserved or outstanding rights, provided for by statue or treaty. Exploration or development of leasable minerals using existing roads or not requiring use of roads could still occur.

Watersheds covering about 3 million acres of the 9.3 million acres of Idaho Roadless Areas have soils that are highly susceptible to erosion and / or landslide risk. Approximately 12 miles of permanent road construction and 3 miles of temporary construction are projected to occur in the foreseeable future (next 15 years based upon 0.8 mile of permanent road and 0.2 mile of temporary road per year projected). All of which would be related to non-timber cutting activities such as access to rights-of-way, leaseable minerals, and recreation. This alternative presents the least risk to soil, water, and air resources.

Existing Plans

Forest Plans land use classifications were put into five land use themes presented in the Proposed Rule. These were: Wild Land Recreation, Primitive, Backcountry, GFRG, and Special Areas of Historic or Tribal Significance (SAHTS).

Approximately 83 percent of the 9.3 million acres of Idaho Roadless Areas are included in land-management plan prescriptions that would allow road construction, road reconstruction, and timber harvest. Approximately 1.26 million acres are in management prescriptions equivalent to the GFRG theme. Projected road construction and reconstruction in IRAs under this alternative is 12 miles per year, 105 miles of road are projected to be constructed and 75 miles of reconstructed over a 15 year time period. This estimate includes both permanent and temporary roads for timber cutting and non-timber related activities. The projected timber harvest offer of 13.4 million board feet is estimated to occur annually on 2,700 acres. Under Existing Plans road construction / reconstruction is prohibited on about 957,960 acres (table 2) of highly sensitive soils except for a few situations; therefore, there would be little risk to these soils.

The Caribou Forest Plan permits leasing of the estimated 6,750 acres of known unleased phosphate deposits and/or other possible roadless areas that contain undiscovered phosphate resources[4]. Management of leasable mineral resources in IRAs would be guided by each Forest's Land and Resource Management Plan. The existing Caribou Forest Plan does not preclude mining of approximately 13,620 acres of existing Federal unleased phosphate deposits. In the long-term it is reasonable to assume that much of the 13,620 KPLA acres within IRAs that contain mineral reserves would eventually be mined. Roads, pits, and other surface mining facilities would be constructed for this purpose. Additional deposits would likely also be found within these areas.

Existing Plans would allow road construction/reconstruction for geothermal development in some locations in management prescriptions similar to Backcountry and GFRG. It is unknown where and to what degree geothermal resources would be developed; however, since about half the Idaho Roadless Areas have high to moderate potential, it is likely some development would eventually occur. Currently lease applications have been submitted for geothermal exploration, which could affect about 7,000 acres of the Peace Rock Roadless Area on the Boise National Forest and 33 acres of the West Panther Roadless Area on the Salmon National Forest. If fully developed, roads, transmission lines, and other facilities would likely be constructed.

This alternative would have the most area in GFRG and the most potential risk to soil, water, and air resources. Site-specific analysis would occur prior to any future exploration or development and mitigations applied. In general, forests have been moving more roadless areas into management prescriptions that conserve roadless characteristics. Five of the National Forests in Idaho have revised their plans since 1999; the remaining five Forest Plans are older. The newer plans generally place more value on providing for roadless characteristics. The Existing Plans Alternative would have the greatest risk potential for soil, water, and air resources associated with roads, timber cutting, discretionary mining, and other activities.

Proposed Idaho Roadless Rule (Proposed Action)

The Proposed Rule proposes 5 themes for the IRAs. These are: Wild Land Recreation, Primitive, Backcountry/Restoration (Backcountry), General, Rangeland and Grassland (GFRG), and Special Areas of Historic or Tribal Significance (SAHTS). Each theme contains different land management restrictions:

Of the themes presented in the Proposed Rule the Wild Land Recreation, Primitive and SAHTS themes are the most restrictive because they prohibit road construction and allow timber cutting only under limited situations. Discretionary mineral activities are also prohibited under these themes. Under this alternative, the Forest Service would not authorize road construction/reconstruction or surface occupancy for new mineral leases in IRAs managed under these three themes. Because of the prohibitions on ground disturbing activities within the Wild Land Recreation, Primitive, and SAHTS themes, these themes should provide little risk to the soil, water and air resources.

Under the Proposed Rule, road construction/reconstruction would be prohibited on about 885,900 acres of highly sensitive soils, except for a few situations; therefore, there would be very little effect on about a third of the highly sensitive soils. About 1,865,800 acres of highly

[4] About 840 acres in the Sage Creek Roadless Area are recommended for no surface occupancy, Section 3.5 Minerals and Energy.

sensitive soils (table 2) are in the Backcountry theme in the Proposed Rule. About 255,490 acres are in the GFRG theme which permits road construction and reconstruction activities.

Based on foreseeable projections about 38 miles of road are anticipated to be constructed and 23 miles reconstructed over the foreseeable future (next 15 years) in Idaho Roadless Areas. The risk incurred by building small numbers of mostly temporary roads would be minimal and their adverse effects would last only a few years for those roads that are properly placed into long-term storage or obliterated following the management activity. In addition, the Proposed Rule emphasizes using techniques to reduce resource effects from road construction.

There are 14,460 acres of known unleased phosphate deposits on the Caribou-Targhee National Forest. About 13,190 acres (90 percent) are located within the Backcountry and GFRG themes. Under these themes road construction or reconstruction would be permissible to develop these phosphate deposits.

These deposits are located within nine roadless areas (Dry Ridge, Huckleberry Basin, Meade Peak, Sage Creek, Schmid Peak, and Stump Creek on the Caribou portion of the Forest; and Bald Mountain, Bear Creek, and Poker Creek on the Targhee portion of the Forest) and could eventually be mined over an extended period of time (50 or more years). There is a potential risk to soil resources on these 13,190 acres if and when development should occur. Site-specific analysis would occur prior to any future exploration or development, and mitigations applied.

About 1,280 acres of unleased phosphate deposits are in the Primitive theme. The Primitive theme prohibits road construction / reconstruction or surface occupancy for phosphates; therefore, this area would likely not be developed and there would be no effect on soil resources found in this area.

The Proposed Rule would also allow road construction / reconstruction for geothermal development in the GFRG theme. About seven percent of Idaho Roadless Areas are in this theme, however only about four percent could be developed because of slope restrictions. It is likely some of these areas would be developed over time; however, except for two pending lease applications there is no information about where or when the activity would occur. If fully developed, roads, transmission lines, and other facilities would likely be constructed. Site-specific analysis would occur prior to exploration or development of geothermal energy resources and would include consideration of sensitive soils.

Currently lease applications have been submitted for geothermal exploration within 7,000 acres of the Peace Rock Roadless Area on the Boise National Forest and 33 acres of the West Panther Roadless Area on the Salmon National Forest. Both these areas are in either the Primitive or Backcountry themes; therefore, they would not be developed because of the inability to construct roads to access the area. No soil resources would be affected in these areas.

Projected road construction and reconstruction in IRAs under this alternative is four miles per year. This estimate includes both permanent and temporary roads for timber cutting and non-timber related activities. The projected timber harvest offer of 5.8 million board feet (MMBF) is estimated to occur annually on 1,200 acres.

The Backcountry theme allows some road construction and timber cutting. The allowances include all the permissible actions in the 2001 Rule with the addition of allowing activities necessary to perform expedited hazardous fuel treatment in Backcountry / Restoration areas at significant risk of wildfire or insect / disease epidemics. Most new roads would be temporary,

unless the responsible official determines that a permanent road meets the road exceptions and would not substantially alter any of the roadless characteristics. This Alternative would pose the greatest risk of the alternatives considered as measured by the selected risk factors.

Modified Idaho Roadless Rule (Preferred Alternative)

The Modified Rule was constructed to better address public comments on the Draft EIS. Projected road construction and reconstruction in IRAs under this alternative is 2.2 miles would be constructed 1.1 miles and reconstructed per year, or 33 miles of road construction and 17 miles of road reconstruction over the next 15 years. This estimate includes both permanent and temporary roads for timber cutting and non-timber related activities. This level of construction would be spread across about 6 million acres.

The projected timber harvest offer of 5.0 MMBF is estimated to occur annually on 1,000 acres. Under the Modified Rule, road construction / reconstruction would be prohibited on about 967,300 acres of highly sensitive soils, except for a few situations; therefore, there would be no direct road related effect on about a third of the highly sensitive soils. About 1.9 million acres of highly sensitive soils are in the Backcountry theme in the Modified Rule. Road construction and reconstruction would be allowed in limited situations in the Backcountry theme, primarily in areas within the community protection zone (CPZ). About 126,500 acres of sensitive soils are in the CPZ.. Within the Backcountry theme only temporary roads may be used to facilitate timber harvest in the Modified Rule.

About 127,000 acres are in the GFRG theme which permits road construction and reconstruction activities.

There are 14,460 acres of known unleased phosphate deposits on the Caribou-Targhee National Forest. Under the Modified Rule roads could be constructed or reconstructed to access about 5,770 acres of unleased phosphate deposits in the GFRG theme.

These deposits are located within six roadless areas (Dry Ridge, Huckleberry Basin, Meade Peak, Sage Creek, Schmid Peak, and Stump Creek on the Caribou portion of the forest and could eventually be mined over an extended period of time (50 or more years). There is a potential risk to soil resources on these 5,770 acres when and if development should occur. Site-specific analysis would occur prior to any future exploration or development and mitigations applied.

About 1,280 acres of unleased phosphate deposits are in the Primitive theme and 6,500 acres in the Backcountry theme[5]. The Primitive theme prohibits road construction / reconstruction or surface occupancy for phosphates; therefore, this area would likely not be developed (Minerals and Energy Specialist Report 2008) and there would be no effect on soil resources found in this area. The Backcountry theme prohibits road construction and reconstruction to access unleased phosphate deposits, but permits surface use and occupancy. However, without access it is unlikely these deposits would be developed.

Similar to the 2001 Rule the Modified Rule prohibits road construction / reconstruction for new mineral leases in all themes. In addition, the Modified Rule prohibits surface use and occupancy of new mineral leases in the Wild Land Recreation, Primitive and SAHTS themes. Surface use

[5] Another 910 acres of unleased phosphate deposits are in the Bear Creek Roadless Area in the GFRG theme. However, no road construction or reconstruction is permitted to access these deposits.

and occupancy would be permitted in the Backcountry and GFRG themes if allowed in the forest plans. It is unlikely new mineral development would occur in any of the themes without road access; therefore there would be limited risk to soil resources.

Of the themes, the Wild Land Recreation, Primitive, and SAHTS themes are the most restrictive because they prohibit road construction, road reconstruction and permit timber cutting only under limited situations. Discretionary mineral activities are also limited under these themes. Under this alternative, the Forest Service would not authorize road construction / reconstruction or surface occupancy for new mineral leases in IRAs managed under these three themes. Because of the prohibitions on ground disturbing activities within the Wild Land Recreation, Primitive and SAHTS themes, these themes should provide little risk to the soil, water and air resources.

The Backcountry theme allows some road construction, and timber cutting. The allowances include all the permissible actions in the 2001 Rule. New roads to facilitate timber harvest would be temporary and must be decommissioned after use.

Within the Backcountry theme temporary roads could be constructed within a CPZ. Outside the CPZ temporary roads could only be constructed where needed to facilitate timber harvest needed to reduce adverse effects of wildland fires to protect communities or municipal watersheds under specific conditions. Temporary roads would be decommissioned after use.

The GFRG theme would allow the most ground disturbing activities.

Comparison of Relative Risks

Due to the broad state-wide scale and the absence of specific locations and types of ground-disturbing actions the comparison of alternatives is general rather than site-specific. Table 1 shows the number of acres in each theme by alternative.

To distinguish the relative differences between the three alternatives, the Existing Plans and the Proposed and Modified Rules were compared to the 2001 Rule with regard to the following indicators:

- Road miles, to indicate the relative risks of road associated erosion and sedimentation.
- The number of acres identified as having: unstable soils, lack of vegetation cover, and known impacts where there is a likelihood of hillslope erosion and / or landslides exist.
- The number of surface and ground water drinking source.
- The miles of streams and rivers not meeting water quality standards (listed on Idaho's 303(d) list of impaired waters
- The proximity to Class I air quality areas.

Table 1. Number of acres by Alternative and Management Theme

	Wild Land Recreation	Primitive	Backcountry Restoration	Backcountry Restoration CPZ	GFRG	SAHTS	Forest Plan Special Areas
Existing Plans	1,320,500	1,904,100	4,482,000	n/a	1,263,2000	0	334,500
Proposed Rule	1,378,000	1,652,800	5,258,700	n/a	609,600	70,700	334,500
Modified Rule	1,479,700	1,569,500	5,312,900	442,000	405,900	48,600	334,500

Table 2. Risk Factor Summary Table – Listed Streams, Soils, Air, and Roads

	Total Miles of 303(d) Listed Stream	Number of Acres having high sensitivity soils[a]	Number of Acres within 50 miles of a Class I Air Quality Protection Area	Road Miles by Alternative and Land Use Theme[b]	New Roads Projected Over 15 Years[c]
~Total 2001 Rule managed similar to Backcountry with some exceptions	2,935	3,116,430	7,455,821	2,052	15
Wild Land Recreation	268	213,324	757	36	
Primitive	444	671,878	1,605,919	174	
Primitive within 1 ½ mile of community	77	72,758	176,506		
Backcountry	1,370	1,589,025	3,143,941	805	
GFRG	533	460,343	706,936	689	
Forest Plan Special Area	243	109,101	290,072	46	
SAHTS	0	0	0	0	
~Total Existing Plans	2,935	3,116,430	7,450,277	2,052	180
Wild Land Recreation	322	261,208	1,264,969	41	
Primitive	305	523,404	1,408,765	182	
Primitive within 1 ½ mile of community	63	75,744	161,245		
Backcountry Restoration	1,590	1,865,840	4,030,640	1,454	
GFRG	358	255,490	223,884	329	
SAHTS	53	25,643	70,703	46	
Forest Plan Special Area	243	109,101	290,072	0	
~Total Proposed Rule	**2,934**	**3,116,430**	**7,450,277**	**2,052**	**60**
Wild Land Recreation	341	292,515	1,366,695	44	
Primitive	314	584,893	1,487,876	181	
Primitive within 1 ½ mile of community	60	68,213	152,078		
Backcountry	1,555	1,786,491	3,562,068	1,305	
Backcountry CPZ	194	126,485	370,953	114	
GFRG	176	127,049	171,945	362	
SAHTS	243	21,711	48,582	46	
Forest Plan Special Area	53	109,101	290,072	0	
~Total Modified Rule	**2,936**	**3,116,458**	**7,450,277**	**2,052**	**50**

[a] *Data used to representative sensitive soils is derived from the FEIS Interior Columbia Basin Ecosystem Project and Inland West Watershed Analysis (Interior Columbia Basin Ecosystem Management Project maps, http://www.icbemp.gov/). Sixth level watersheds were assigned a level of low, moderate and high soil sensitivity. Acres of roadless designation within a high sensitivity watershed are included in table 1.This database represents an estimate of soil types based upon varying intensity levels of soil inventory. Acres across management themes should be qualitatively compared between alternatives. The data represents the best available data for soil sensitivity across the National Forest roadless designated areas in the state of Idaho.*

[b] *This data represents roads within the 2001 Rule area on National Forest including system and non-system roads based on the roads data from the 12/2006 FOIA Request. It represents the best effort to sift out "Existing" roads. The non-system roads include but are not limited to "jammer roads and user created routes" and other roads that had no designation for "SYSTEM". Not all datasets were equal and as much data that was available was used to create the dataset used for this analysis. Differences in total miles is so small that there is little change in either the Proposed or Modified Rules from the 2001 Rule.*

c *The themes for projected new roads are not known. Roughly 25 percent would be permanent roads to access mining claims, abandoned mine cleanup, access to private lands (those uses covered by existing Federal laws independent of this Rule). Timber harvest and fuels management would construct only temporary roads in all management themes.*

Table 3. Risk Factor Summary Table - Acres of watersheds with groundwater, surface water, and both ground and surface water community public waters systems, by management theme, by alternative

Theme	2001 Rule	Existing Plans	Proposed Rule	Modified Rule
Wild Land Recreation				
Groundwater system	0	87,200	86,400	91,400
Surface water system	0	14,200	15,500	15,500
Both systems	0	4,700	6,000	6,000
Total	**0**	**106,100**	**107,900**	**112,900**
Primitive				
Groundwater system	0	207,500	177,800	172,800
Surface water system	0	115,300	93,300	93,300
Both systems	0	31,500	14,500	14,500
Total	**0**	**354,300**	**285,600**	**280,600**
SAHTS				
Groundwater system	0	0	100	100
Surface water system	0	0	0	0
Both systems	0	0	0	0
Total	**0**	**0**	**100**	**100**
Similar to Backcountry				
Groundwater system	860,900	0	0	0
Surface water system	239,400	0	0	0
Both systems	80,800	0	0	0
Total	**1,181,100**	**0**	**0**	**0**
Backcountry				
Groundwater system	0	416,100	477,600	498,500
Surface water system	0	89,600	118,200	118,300
Both systems	0	29,000	54,400	54,600
Total	**0**	**534,700**	**650,200**	**671,400**
GFRG				
Groundwater system	0	114,900	83,800	62,900
Surface water system	0	18,000	10,200	10,200
Both systems	0	14,700	5,000	4,800
Total	**0**	**147,600**	**99,000**	**77,900**
Forest plan special areas				
Groundwater system	0	35,100	35,100	35,100
Surface water system	0	2,200	2,200	2,200
Both systems	0	900	900	900
Total	**0**	**38,200**	**38,200**	**38,200**

In the Modified Rule, about 64,200 acres of groundwater, 11,500 acres of surface water, and 26,000 acres of both ground and surface water systems overlap community protection zones.

These themes would all, to varying degrees, prohibit road construction and reconstruction, timber harvesting, mineral extraction, and geothermal energy development in IRAs on NFS lands in Idaho. The management themes would all (1) prohibit most road construction and reconstruction, (2) prohibit timber harvest designed exclusively for commodity production purposes, and (3) allow timber harvest for stewardship purposes. Of the land use themes only Backcountry and GFRG themes differ in practical terms from the 2001 Rule. Backcountry would allow temporary roads and logging of dead or dying trees or for fuels treatment and GFRG would permit logging for stewardship purposes and mining. When the six risk factors are compared for the GFRG theme (areas where the widest variety of activities are allowed) the Modified Rule shows the least amount of potential risk as compared to the 2001 Rule.

Over a 15 year period the Existing Plans are projected to construct / reconstruct an estimated 180 miles of road, while the Proposed Idaho and Modified Rule alternatives would construct 61 and 50 additional miles respectively. The 2001 Roadless Rule is projected to construct 15 miles of road over 15 years. It is estimated that roughly 25 percent of the road construction would be permanent. Based on recent history in Idaho it is highly likely that the number of roads decommissioned would exceed the estimates made in table 2 (see table 3). Of the risk factors identified, the acres of sensitive soils and the miles of road would be the most directly related to non-point source risk. Greater miles of road and acres of sensitive soils would indicate greater relative risk of non-point contamination.

The GFRG theme would present the most risk to physical resources as it would permit the widest range of ground disturbing activities followed by the Backcountry theme. The generalized risk calculations were made to disclose the changes among the five risk factors and the Existing Plans and the Proposed and Modified Rules. No on the ground actions would occur due to management in either of these categories until specific projects are proposed and the NEPA planning process completed.

Table 2 illustrates that when the Backcountry and GFRG themes are combined all themes would increase the potential changes in the risk factors selected. However, when GFRG theme, which would allow the widest array of activities, is compared alone the Existing Plans theme would increase the potential change in the risk factors selected. About 1,263,200 acres in Existing Plans are in management prescriptions equivalent to GFRG. The Proposed Rule would designate approximately 609,600 acres to GFRG. The Modified Rule developed as a result of public comments on the draft EIS reduced the amount of GFRG to 405,900 acres. It would allow additional road access primarily to rangelands and areas with potential mining primarily on the Caribou portion of the Caribou-Targhee National Forest (about 40 percent of the acres changed from the 2001 Rule).

The amount of mining and energy development as a result of the Forest Plans or the Proposed and Modified Rules is not known. Under the Modified Rule road construction / reconstruction is prohibited to access new mineral development except for specific phosphate deposits. Surface use and occupancy would be permitted in the Backcountry and GFRG themes under the Modified Rule, if it is allowed in the forest plan. (This is the same as the 2001 Roadless Rule). It is reasonable to anticipate that at least some expansion of these activities would occur as economic conditions increase the value of minerals and energy production. Each would have the potential to cause adverse effects. To address these risks, it is reasonable to assume that individual projects on National Forests would address potential effects and mitigation needs in a public planning process.

A warming climate change and continued increased fire activity may expose larger areas to severe wildfires than was experienced within the 20th Century. Class I Air Quality Protection Areas would likely receive longer periods of denser smoke. Post fire recovery of ecosystems may take longer and project planning teams may find landscapes more sensitive to man's perturbations than in the past. Disturbances on hill slopes may take longer to grow protective vegetative cover and as a result alluvial stream and river channels may receive greater volumes of sediment for longer periods of time. Future Forest Service interdisciplinary assessment teams would need to recognize increased sensitivity of the general environment when recommending ground disturbing activities. Activities that reduce the risk and size of severe wildfire will likely receive more emphasis as warming occurs.

Table 2 presented the number of acres within 50 miles of a Class I airshed (Wilderness Areas and National Parks). Figure 6 illustrates the areas within 50 miles of Class I Airsheds (Wilderness Areas and National Parks). Much of the Caribou-Targhee National Forest in southeastern Idaho where additional phosphate mining is proposed falls outside of the 50 mile radius of these areas.

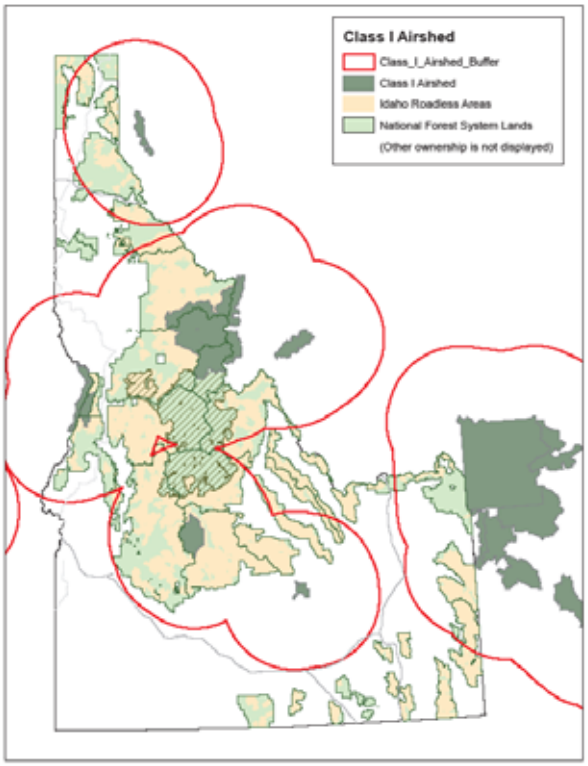

Figure 6 – Proximity to Class I Airsheds

In the Statewide context projections for new road building (12 in the Existing Plans, 4 miles per year in the Proposed Rule, and 3.3 miles per year in the Modified Rule) indicate that none of the alternatives would provide broad scale detrimental effects. Though even well designed and constructed roads would create some increased risk of erosion and sedimentation, proper location and design and the use of best management practices during construction, and proper maintenance can minimize the risk. The risk incurred by building small numbers of mostly temporary roads would be minimal. The adverse affect to soil, water, and air resources would

last only a few years for those roads that are properly placed into long term storage or obliterated following the management activity. Roads used to conduct fuels management treatment in priority areas to reduce the likelihood of high intensity wildfire would also serve to reduce the risk of severe wildfire and the associated effects to soil, water, and air resources. Watershed studies have indicated that water and sediment yield increases from fires varies significantly depending on fire intensity and severity. Low intensity / severity fires generally return to pre-fire conditions within 3 years while high intensity / severity fires may take 15 years (or sometimes longer) to recover (DeBano et al. 1999).

Water, soil, and air resources have measurable characteristics that operate within naturally variable ranges of values. Water yield, timing, and quality, soil erosion, air quality, and other characteristics can vary widely, even in undisturbed situations. Land management practices, such as road construction, and reconstruction, timber harvest, mining, prescribed burning, and other similar activities, can affect these values, and their variability. Although, BMPs do not completely eliminate unwanted impacts, they do provide practicable means of reducing the amount of pollution generated by nonpoint sources (Idaho Department of Environmental Quality [DEQ] 2008, Seyedbagheri 1996). Forest practices audit results in Idaho showed that 99.6 percent BMP implementation compliance rate (Idaho DEQ 2007).

Currently all Forest Service permanent and temporary roads needed for timber sales are designed and constructed using water, soil, and air BMPs that meet or exceed those required by the State of Idaho. Road design and management criteria incorporate the latest knowledge and experience, resulting in fewer effects (such as surface erosion, landslides, sedimentation, and dust emissions) on water, soil, and air resources. Proper design and construction of new roads and maintenance of existing and new roads can limit but not eliminate these effects (USDA Forest Service 2000b). Budgets may remain flat in nominal terms but decline in real terms. This implies that managers would place an emphasis on: 1) reducing the miles of roads being maintained by putting roads into self maintaining, long term storage, or decommissioning (obliterating) them, 2) approving minimal new construction, and 3) lowering maintenance standards on roads remaining. To cope with budget shortfalls, emphasis has been placed on placing existing roads in long term storage or obliterating them altogether. It is highly likely that many more miles of road will be placed into storage or obliterated than would be built in any of the land management themes.

Figure 7 - Decommissioned road, Clearwater National Forest

These themes would all, to varying degrees, prohibit road construction and reconstruction, timber harvesting, mineral extraction, and geothermal energy development in inventoried roadless areas on National Forests in Idaho. The management themes would all (1) prohibit most road construction and reconstruction, (2) prohibit timber harvest designed exclusively for commodity production purposes, and (3) allow timber harvest for stewardship purposes. All ground disturbing actions proposed in any of the themes would require National Environmental Policy Act (NEPA) assessment. The planning process used by the USDA Forest Service is transparent and public involvement is encouraged at every stage of alternative development and analysis to help insure that all potential issues and concerns are identified and addressed.

Approximately 31, 17, and 8 watersheds were placed into GFRG theme in the Forest Plans, Proposed Rule and the Modified Rule respectively that had surface water community water supplies. Likewise, 84, 42 and 44 respectively had ground water community water supplies. A number of these watersheds have both surface and ground water supplies so the actual total of the two categories is less (see figure 8).

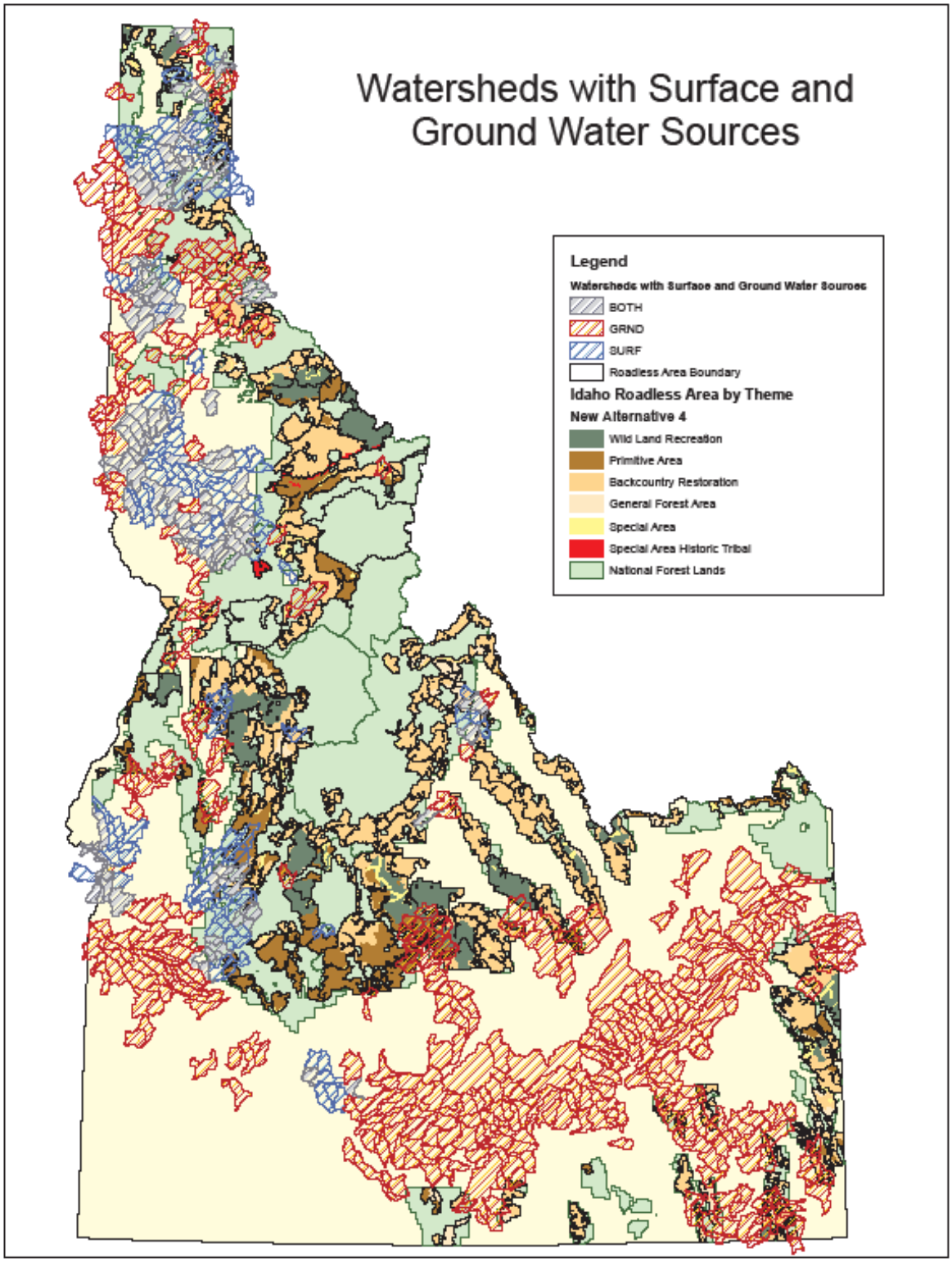

Figure 8 – Community Source Water Supplies and Land Use Themes

Cumulative Watershed Effects

Cumulative effects for soil, water and air resources are generally considered as incremental changes that alone are not overwhelming but when combined, the impacts are judged to be detrimental or beneficial. Assessment of management caused cumulative effects must be done in the spatial and temporal context of naturally occurring events such as wildfire, drought, floods, earthquakes, and insect infestations which can all alter physical conditions affecting soil, water, and air resources even without man induced perturbations. Since no specific actions are prescribed or authorized by any of the land management themes (alternatives) no assessment of cumulative effects was conducted beyond identification of the risk factors presented. It is likely that restricting road construction common to all the land use themes to a lesser or greater extent would reduce the risks of adversely affecting soil, water, and air resources either directly or cumulatively. Table 2 shows the recent road construction, reconstruction and decommissioning history for all National Forests in Idaho. If current trends continue (and there is no reason to think they will not), these data indicate that it is highly likely that many more miles of road would be placed into storage or obliterated rather than built in any of the land management themes, and if so cumulative effects could be positive (see table 3).

Table 4. Road accomplishment summary for all Forests in Idaho – in miles

All Idaho Forests						
	FY 2006	FY 2005	FY 2004	FY 2003	FY 2002	FY 2001
New Construction	7	7	21	5	4	5
Reconstruction	41	26	56	44	57	39
Decommissioning	184	355	146	161	158	374

Between 2001 and 2006 approximately 29 miles of road in Idaho have been decommissioned for every mile of new construction (USDA Forest Service 2006). Reconstruction of existing roads to current standards generally results in improved drainage structures and reduces risk to water quality. Decommissioned roads are left in a self maintaining condition. Generally culverts are pulled and in some cases partial or total recontouring is conducted as needed to protect water quality.

The minimal amount of annual road construction anticipated in any of the management themes indicates that effects directly associated with road construction or ancillary effects will be limited to a relatively few areas within Idaho (See table 5).

Table 5. Summary of Roads Timber Harvest by Management Theme (only those acres or miles within the themes)

Projections for Selected Management Activities	2001 Roadless Rule	Existing Plans	Proposed Rule	Modified Rule
Road construction and reconstruction, miles per year	1	12	4	3.3
Timber Cutting – acres per year	600	2,700	1,200	1,000

Summary

Of the indicators selected, few showed large differences and it is unlikely that changes in water quality, timing or yield would be measured at the watershed scale most often associated with project analysis (10,000 to 40,000 acres). None of the changes to hydrology are expected to be measurable at the river basin or state wide scale for the risk factors used in this analysis. However, the differences in both hydrology and air quality may be important at site specific locations and be measurable at smaller watershed scales. Site specific effects of possible future road building or ancillary effects such as mining operations, geothermal development, or off road vehicle use initiated following new road construction may be locally important but cannot be assessed within the Idaho Roadless Area Conservation programmatic EIS. The potential is likely highest for areas opened to phosphate mining where ground disturbance would be the greatest. Selenium has been identified as a contaminant associated with phosphate mining. Selenium can bio-accumulate and can be toxic to both terrestrial and aquatic plants and animals. The risks of selenium and other issues related to the Roadless Area Conservation EIS would need to be identified and addressed in the project planning NEPA process. This EIS in no way reduces the responsibility of the USDA Forest Service at the project level to comply with the National Forest Management Act, National Environmental Policy Act, Clean Water Act, and other Acts, Executive Orders, and policies.

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